In the Rotatoria, as shown by Huxley in Lacinularia,[*] and by Williamson in Melicerta,[†] the yolk is at first a single globular mass, the first changes which take place in it being as follows:—"The central nucleus becomes drawn out and subdivides into two, this division being followed by a corresponding segmentation of the yolk. The same process is repeated again and again, until at length the entire yolk is converted into a mass of minute cells." Among the Crustacea the total segmentation of the yolk occcurs among the Copepoda, the Rhizocephala, and Cirripedia. Sars has described the same process in one of the nudibranchiate mollusca[‡] (Tritonia), Muller in Entochocha,[§] Haeckel in Ascidia,[||] Lacaze Duthiers in Dentalium.[¶] Figures 18 to 21, Pl. 6, are taken from Koren and Danielssen's[**] memoir on the development of *Purpura lapillus.*

Figs. 22-24 show the same stages in a fish (Amphioxus) as given by Haeckel, and it is unnecessary to point out the great similarity.

Lastly, figures 25 to 29, Pl. 6, are given by Dr. Allen Thomson,[††] as illustrating the first stages in the development of the vertebrata.

I might have given many other examples, but the above are probably sufficient, and show that the processes which constitute the life-history of the lowest organised beings, very closely resemble the first stages in the development of more advanced groups; that, as Allen Thomson has truly observed,[‡‡] "the occurrence of segmentation and the regularity of its phenomena are so constant that we may regard it as one of the best established series of facts in organic nature."

It is true that yolk segmentation is not universal in the animal kingdom; that there are great groups in which the yolk does not divide in this manner,—perhaps owing to some difference in its relation to the germinal vesicle, or perhaps because it has become one of these suppressed stages in embryological development, many instances of which might be given, not only in zoology, but, as I may state on the authority of Dr. Hooker, in botany also. But however this may be, it is surely not uninteresting, nor without significance, to find that changes which constitute the life-history of the lowest creatures, form the initial stages even of the highest.

Returning to the immediate subject of this work, I have pointed out that many beetles and other insects are derived from larvæ closely resembling Campodea, that other insects come from larvæ more or less like Lindia, and it has been shown over and over again that in many circumstances the embryo of the more specialised forms resembles the full-grown representatives of lower types. I conclude, therefore, that the Insecta generally are descended from ancestors resembling the existing genus Campodea, and that these again have arisen from others belonging to a type represented more or less closely by the existing genus Lindia.

Of course it may be argued that these facts have not really the significance which they seem to me to possess. It may be said that when Divine power created insects, they were created with these remarkable developmental processes. By such arguments the conclusions of geologists were long disputed. When God made the rocks, it was tersely said, he made the fossils in them. No one, I suppose, would now be found to maintain such a theory, and I believe the time will come when it will be generally admitted that the structure of the egg, and its developmental changes, teach us as truly the course of organic development in ancient times, as the contents of rocks teach us the past history of the earth itself.

JOHN LUBBOCK

NOTES

SIR CHARLES WHEATSTONE has been elected a Foreign Associate of the French Academy of Sciences in place of the late Baron Liebig.

MR. COLE's retirement from public service is now completed, and the Treasury have awarded him the full pension usually granted to officers who have completed fifty years of public service. Although Mr. Cole quits the South Kensington Museum, he will continue to assist in promoting the diffusion of Science and Art applied to productive industry as the Acting Commissioner for the estate purchased out of the surplus funds of the Exhibition of 1851. This estate at present comprehends the Horticultural Gardens, the buildings of the Annual International Exhibitions, and the Royal Albert Hall. Measures are in progress for forthwith commencing the National Training School for Music. A meeting of those interested in the Testimonial which it is proposed to present to Mr. Cole, will be held in Willis's Rooms to-morrow at 3 o'clock. Those who know best how much Mr. Cole has done for the encouragement and advance of Science, will, we are sure, be the most ready to take part in this well-deserved testimony to the value of his services to the public.

AFTER the alarming rumours that have recently found their way into the newspapers, it is a great relief to receive what appears to be really authentic news of the safety of Sir Samuel and Lady Baker. It appears, from the message received by the *Daily Telegraph*, that they arrived at Khartoum on the 29th of June. It is stated that the party had been as far south as a place called Mosindi, near the chief village of Kamrasi, the King of Unyoro, which would be in about 1°45′ N. lat., and about 80 miles to the east of the shores of the Albert Nyanza. Here Sir Samuel is said to have been attacked by a chief named Kabriki, and, on his retreat, by a party of slave-hunters. He seems to have established another Egyptian station at a place called Fatiko, somewhere to the south of Gondokoro. The story about the Albert Nyanza and Lake Tanganyika being one, which forms part of the news published by the *Daily Telegraph*, is certainly very startling news, and must at present be received with great caution, though the *Telegraph* correspondent declares he received it direct from the lips of the Emancipator of Central Africa himself.

MR. AUBERON HERBERT's Select Committee on the Wild Birds Protection Act has met three times, and examined a good many witnesses. It would not be fair to take the report, published in the *Field*, of what passed at those meetings as strictly correct, but if it be at all true, the doubt, before expressed in these pages (NATURE, May 1, 1873), as to any real good resulting from the inquiry, can hardly be otherwise than justified. The questions put by the chairman indicate, as far as we perceive, that he has a very hazy idea of the bearings of the whole subject, and no one of the other members appears to have sufficient knowledge of any part of it to follow home by cross-examination any of the evidence offered in reply. By many of the witnesses birds are regarded as divisible into two groups—the useful and the noxious—a simple classification which will be amusing to naturalists. Such witnesses also think that the destruction of the latter should be encouraged and the former protected—being quite innocent of the fact that no laws in the world will make most "useful" birds more numerous than they already are. It seems to us that the only way in which an inquiry of this kind could be satisfactorily conducted would be by a Royal Commission, in which the scientific element, so unhappily lacking in a Parliamentary Committee, should be adequately represented. The birds which suffer a perfectly preventible persecution to such an extent that their extermination may shortly be expected, appear to be thought hardly worthy of the Committee's consideration, though it was to save them that the British Association's efforts were chiefly directed.

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[*] Trans. of the Microsc. Soc. of London, 1851.

[†] Quarterly Journal of Microsc. Science, 1853.

[‡] Wiegmann's Archiv., 1840, p 196.

[§] Ueber die Erzeugung von Schnecken in Holothurier. Berlin, Bericht, 1851. Ann. Nat. Hist, 1852, v. ix. Muller's Archiv., 1852.

[||] Ann. des Sci Nat. 1853, p 89

[¶] Ann. des Sci. Nat, 1857, pl. vi.

[**] Naturliche, Schöpfungsgeschichte, pl. x.

[††] Cyclopædia of Anatomy and Physiology. Art. Ovum, p. 4.

[‡‡] Thomson, l.c. Article, Ovum p. 139.

The Highland and Agricultural Society of Scotland have taken a praiseworthy step in memorialising Government to do what is undoubtedly their duty to the country, appoint a Commission of competent scientific men to inquire into the causes of the ever-recurring potato-disease, a disease which is a national calamity. How far advanced is the American Government in matters concerning the national welfare is well shown by the memorialists, and even Portugal is far enough ahead of us to appoint a Government Commission to inquire into the vine-disease.

The Executive Committee of the Fund for erecting a memorial to the late John Stuart Mill have resolved that a portion of the funds raised be devoted to erecting a bronze statue of Mr. Mill in some public situation in the City of Westminster, which he for a time represented in Parliament, the remainder to the foundation of Scholarships, open to the competition of candidates of both sexes, in Mental Science and Political Economy; subscribers to the fund being invited to say to which of these purposes they wish their subscriptions to be devoted.

The Council of University College, London, has determined to throw open to women next session another of its ordinary classes, that of jurisprudence, conducted by Prof. Sheldon Amos.

We are glad to see from a circular which has been sent us, and which we would recommend to the attention of all teachers, and to all interested in science-teaching in schools, that the Charterhouse School of Science has met with signal success during the past, its first, session. There is an excellent staff of scientific lecturers, which we are glad to see is to be increased, the training is thorough and practical, and a large and well-fitted chemical laboratory, besides other scientific apparatus, is to be added to the School. The School is in connection with the Science and Art Department, and we hope that during next session, which commences on September 20, the attendance will be as satisfactory as during the past. Attached to the circular is a form to be filled up by intending students, and accompanying it is a well-drawn up time-table. The fees are remarkably low.

At a meeting of the Council of the Royal School of Mines, held on Saturday, July 5, the following gentlemen received the diploma of Associate of the Royal School of Mines:—Mining and metallurgical division—E. Jackson, J. A. Griffiths, C. Law. Mining division—A. G. Phillips. Metallurgical division—J. W. Westmorland, S. W. Davies, J. C. Jefferson, H. S. Bell. Geological division—G. Smith. The following Scholarships and Prizes were also awarded:—The two Royal Scholarships of 15*l*. each, for first year's students, to Mr. H. Carter and Mr. A. J. Meeze. To second year's students: H.R.H. the Duke of Cornwall's scholarship of 30*l*. for two years, to Mr. C. Lloyd Morgan, and the Royal Scholarship of 25*l*. to Mr. S. A. Hill. The Edward Forbes' medal and prize of books, for Natural History, to Mr. G. Smith. The De la Beche medal and prize of books, for mining, to Mr. Edgar Jackson. The Murchison medal and prize of books, for geology, to Mr. C. Lloyd Morgan.

Signor Augusto Righi, Demonstrator of Physics in the University of Bologna, has just published an elaborate memoir "On the Composition of Vibratory Motions" (*Tipi Gamberini e Parmeggiani, Bologna*). The memoir is of a high order, and is worthy the attention of all physicists specially interested in acoustics. The subject is mathematically treated, and is illustrated by twenty-one admirable plates.

Mr. W. Carruthers has just issued his official Report for 1872, of the Department of Botany in the British Museum. The additions to the Herbarium during the year are spoken of as large and important, rendering more and more pressing the necessity of increasing accommodation for the arranged Herbaria. The species included under several of the natural orders, both in the General and in the British Herbarium, have been entirely re-arranged during the year; and much use has been made of the Herbarium by botanists preparing monographs for a number of different publications. Numerous interesting additions have also been made to the Structural Series, both in the Fruit, the Fossil, and the General Collection.

We have received "Lecture Extra, No. 8" of the *New York Tribune*, containing twelve lectures by Prof. Louis Agassiz, on various important subjects connected with animal life; besides a lecture on "Vestiges of Antiquity," by Dr. A. Le Plongeon, "The Art of Dyeing," by Prof. Chandler, a long article on the Fossil Man of Mentone, and a detailed account of Prof. Marsh's discoveries in the Rocky Mountains. All these lectures and articles are copiously illustrated and well printed, and the whole is a marvellous pennyworth. The *Tribune* deserves the greatest praise for the important part allotted to science in its programme.

In the just published number of the *Journal of Anatomy and Physiology* there is a valuable paper by Prof. Rutherford, of King's College, on the cause of the retardation of the pulse which follows closure of the nostrils in the rabbit, in which he shows that this retardation is not the direct effect of reflex action, as previously supposed, but is due to the arrest of respiration which necessarily attends the blockage in the air-passage; for the retardation does not commence directly the nostrils are closed, but is delayed for about four seconds, and if the trachea is kept open it does not occur at all. Ammonia applied to the nose produces similar effect, because the animal ceases to breathe for a time, as it closes the nostrils in order to prevent the entrance of the irritating fumes. Prof. Rutherford finds that after the vagi have been divided, the arrest of respiration does not cause the pulse to become slower, which is in favour of the supposition that the retardation which normally occurs is produced by the action of the impure blood on the cardio-inhibitory centres in the medulla oblongata.

The *Journal of Botany* records the death of two British botanists of reputation, Mr. James Ward, of Richmond, Yorkshire, one of the most active and experienced botanists of the North of England, and Mr. James Irvine, of Chelsea, who wrote a "London Flora" in 1838, and was one of the editors of the old *Phytologist*.

A Flora of Cheshire is shortly to appear under the superintendence of the Hon. J. L. Warren.

We have to record the following earthquakes this week:—The Imperial Meteorological Observatory of Constantinople reports that on June 20 there were several smart shocks of earthquake at Bagdad at night, and again on the 21st at noon. A strong shock of earthquake was felt at Alpago, Italy on July 3. A volcanic eruption, accompanied by discharges of hot cinders, is stated to have commenced at Farra. The waters of the Lake Santa Croce, a few miles south-east of Belluno, were boiling. Three shocks of earthquake were felt at Buffalo, U.S., on the morning of July 6, causing the buildings and shipping to rock.

The Synopsis of Laboratory Work in Practical Organic Chemistry at the Teachers' Training Class at South Kensington for July, contains seventy practical problems in chemistry, with directions for their solution.

A great International Exhibition is to be held at Philadelphia in 1876.

In the *Weekly Salt Lake Tribune* of June 7, a lecture is reported on the Sandwich Islands by Dr. Winslow, who resided there for several years. The light in which he represents the natives of Hawaii to regard the death of Captain Cook will be new to many of our readers. "The natives were astonished and distressed at their own barbarity, and they treated the remains of Cook as they did those of their highest chiefs and as if he had been a god. They dissected the big bones from his legs and arms, as a mark of the highest honour they could confer on their own beloved dead. They exposed the rest of his remains before their great idol in the temple, and sacrificed hogs and dogs to his memory and to appease the gods for his and their own sins. His entrails had been placed carefully in a calabash and left aside, in order for burning in some subsequent ceremony, when a boy (an intelligent old man of some 75 or 80 years in 1845, with whom the Doctor had conversed), supposing them to be the entrails of a hog, cut off a piece and roasted it on coals and ate it. When the officers of the ships, in their subsequent intercourse with the natives to recover the remains of Captain Cook, earned that nothing was left of them but the big bones, which were delivered up to them, they fancied his flesh had been devoured by the savages, and a howl went up from the British public and the Christian world that the newly-discovered Hawaiians were natives and cannibals. Such was not the case at first, and has never been the case. Their first experience with a Christian people was a bitter one, and the cup for them has been bitter from that time to this. The facts attending Captain Cook's death, and the treatment of his remains, the Doctor received from the mouth of an honest old native named Keha, on the island of Maui, a clear-minded man, and one of the hereditary historians of the Kings or Chiefs. The natives always regretted Cook's death."

The German Arctic Navigation Society of Hamburg city has received a telegram from Tromsöe, dated July 6, according to which eighteen Norwegians who had passed the winter in Spitzbergen, have been found dead by the society's schooner *Tromsöe*, Captain Mack. They have been buried by the latter's direction.

The latest novelty in literature is a farthing daily paper, in the shape of *The Penny-a-Week County Daily Newspaper*, a single copy of which may be had for a farthing, but which, by a little arrangement, will be supplied to any subscriber for a penny a week. It is intended as an organ for sowing broadcast the principles of the Conservative party, who, if they really have the welfare of their country at heart, ought to make use of this splendid opportunity for elevating the classes whom they want to influence, by serving up a daily modicum of useful knowledge methodically arranged,—*i.e.* Science.

We have received from A. Ernst his careful paper on the Meteorology of the Carácas, based on three years' observations by Señor Agustin Aveledo.

The "Transactions of the Royal Society of Arts and Sciences of Mauritius" for 1871, which has just reached us, shows that that body is in excellent working order, and is quite alive to the interests of Science in that hybrid colony, especially in the department of Natural History. The curious mixture of French and English in the volume is significant of the history of the island and the mixed nationality of the colonists. The longest, and one of the most valuable and interesting papers in the volume, is Colonel Pike's account (in English) of a visit he paid to the Seychelle Islands, containing important details on the natural history of this remote and little-known group. The Society has been the means of successfully introducing into the Mauritius the cultivation of the silkworm, and an association has been formed for the manufacture of textile fabrics from native plants, especially from the *Agave*.

The "Fourth Annual Report of the State Board of Health of Massachusetts," deserves the attention of all who are interested in the public welfare so far as sanitary matters are concerned. Detailed reports on all subjects connected with public health are given, and some humiliating and curious revelations made as to adulteration of food and drink, which seems to be nearly as universal in Massachusetts as in our own enlightened and very moral country; as is also ignorance of the use and preparation of food. Reports such as these show how lamentable and wide-spread is ignorance of the science of living, and with what a host of adverse influences in the way of adulteration, bad drainage, and such like, civilised man is surrounded.

We have received Memoirs, by Prof. Asa Gray, of the late Mr. John Torrey and Mr. W. S. Sullivant, written for the American Academy of Arts and Sciences.

Part I. of vol. ix. of "The Journal of the Royal Agricultural Society of England and Wales," contains many statistics and papers of great value connected with the subject of Agriculture. Besides a variety of statistics as to grain, Cattle, Sheep, Pigs, Dairy Produce, Prices, &c., the Journal contains the following papers: On the Characters of Pure and Mixed Linseed-Cakes, by Dr. Augustus Voelcker, F.R.S.; Report of the Judges on the Trials of Portable Steam-Engines at Cardiff; Report of Experiments on the Growth of Barley for Twenty Years in succession on the same Land, by J. B. Lawes, F.R.S., and J. H. Gilbert, F.R.S.; Record of Rainfall at Rothamsted (parish of Harpenden) and Harpenden Village, near St. Alban's, Herts, in 1872 and the 19 preceding years; Report on the Trade in Animals, and its Influence on the spread of Foot-and-Mouth and other Contagious or Infectious Diseases which affect the Live Stock of the Farm, by H. M. Jenkins, F.G.S., Secretary of the Royal Agricultural Society; Further Report by the Judges on the Competition for Prizes for Plans of Labourers' Cottages in connection with the Cardiff Meeting, 1872; The Potato Disease, by William Carruthers, F.R.S., Consulting Botanist to the Society; On Dodder, by W. Carruthers, F.R.S.; Annual Report of the Consulting Chemist for 1871; Quarterly Report of the Chemical Committee, December, 1872; Quarterly Report of the Principal of the Royal Veterinary College.

The death of Mr. J. A. Gordon, Superintendent of the Crystal Palace Gardens, is announced. Mr. Gordon was in part trained under Sir Joseph Paxton, and was well known as a contributor to the *Gardener's Magazine*.

Mr. J. L. Hadden, C.E., superintended the electric light arrangements on the occasion of the late *fêtes* at Constantinople for the Sultan's accession. The next morning on awaking he found himself quite blind. The medical men had hopes of his restoration to sight.

The additions to the Zoological Society's Gardens during the past week include a Rock-hopper Penguin (*Eudyptes chrysocoma*), from the Falkland Islands, presented by Mr. J. M. Dean; a tuberculated Lizard (*Iguana tuberculata*), from the West Indies, presented by Mr. J. B. Spence; a Greater Sulphur-crested Cockatoo (*Cacatua galerita*), from Australia, presented by Mr. R. Dean; four black-necked Swans (*Cygnus nigricollis*) hatched in the Gardens; a Beaver (*Castor canadensis*), born in the Gardens; two crimson-faced Waxbills (*Pytelia melba*), from Africa; a Tawny Eagle (*Aquila naevioides*), purchased; a black-tailed Antelope (*Nanotragus nigricaudatus*), an Ariel Toucan (*Ramphastos ariel*), and a West India Rail (*Aramides Cayennensis*), deposited.